

REPORT
OF THE
CANADIAN ARCTIC EXPEDITION
1913-18

VOLUME IV: BOTANY

PART F: MARINE DIATOMS

By ALBERT MANN

SOUTHERN PARTY—1913-16

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OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1925

Issued 12th November, 1925

Report of the Canadian Arctic Expedition, 1913-18.

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SOUTHERN PARTY—1913-16



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Issued 12th November, 1925

The Marine Diatoms of the Canadian Arctic Expedition, 1913-18

BY ALBERT MANN

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The following report is a rather fragmentary contribution to the marine diatom flora of the Arctic seas. The number of gatherings secured was small and the different species they contained turned out to be comparatively few. The list therefore compares poorly with what would have been obtained from the richer floras of other parts of the world. This is not at all a surprising fact, for previous studies of Arctic diatom material have shown that in diversity of species it is uniformly very scanty. As to why this is so no satisfactory explanation has been found. One is disposed to assume that the rigorous temperatures and the long winter nights of these high latitudes must affect the diatoms as they are known to do some other organisms, checking a tendency to elaborateness of structure and consequently to that variability which would after a while give us those differences on which we depend for the separation of species. And in fact we do find that the Arctic diatoms as a class are surprisingly simple in form and much less elaborate in their ornamentation than those of other regions. Especially is there a preponderance of the so-called *Naviculoid* diatoms, rather plain, boat-shaped structures, with simple designs of ornamentation, and destitute of those horns, arms, spines, etc., that often adorn the species growing in warmer waters. So that, if we were to draw deductions from the evident and unusual simplicity of the diatoms of all Arctic gatherings, including those here recorded, we would be pretty sure to infer that cold and darkness had here brought into existence a flora singularly suppressed in its ornamentation.

But a study of the diatoms of the Antarctic seas forbids our putting so much stress on this inhibition of low temperature and dark nights. Without denying wholly its influence, we find in the Antarctic, where usually frigid waters and long periods of night occur, one of the most varied and elaborately ornamented diatom floras now living. There the cruder and perhaps more primitive *Naviculoid* group is in the decided minority, round polygonal and other symmetrical shapes being more common, and usually adorned with complex sculpturing and a variety of horns, spines and other ornamental appendages. If therefore frigid temperatures and long winter nights are responsible for the simplicity in structure and poverty of species of the Arctic diatoms our theory only conjures up another equally difficult problem, namely, why these same factors fail to operate in the Antarctic region. Consequently, as above stated, a good explanation of the marked simplicity of Arctic diatoms is not known to the writer.

There is, however, one fact, perhaps too inconsequent to merit serious thought, which it may be worth while to mention: the Antarctic differs greatly from the Arctic in its approaches. The latter region is joined to the vast seas that flow around the world by only two comparatively narrow channels, a condition due to the fact that both the Eastern and the Western hemisphere have their broad areas at the extreme north and taper away to a point southward; so that the shores of North America on the west are close to those of Asia and on the east to those of Europe; and furthermore, the chief ingress current into the Arctic in through the narrower of these two openings, namely,

Bering strait, while the wider channel between Greenland and Spitsbergen serves mainly for a southward moving outflow. The Antarctic, on the other hand, has no such barriers interposed between it and the rest of the watery world. If one consults a chart of the great sea currents it will be readily seen how free is the interchange between the Antarctic sea and the vast ocean areas of the world, and how restricted the interchange between these and the waters of the Arctic. Now, it is at least possible that the narrowness of these waterways linking the Arctic with the rest of the world constitutes a barrier to the introduction of new forms of marine life from other regions, among which new forms there might well be now and then species adaptable to the rigorous life conditions of polar waters and which would thus add to the richness of its local flora and fauna. For such introductions, multiplied and continued through long ages, would have no inconsiderable influence in this respect. And as the Antarctic sea does lie open to such importations, it is not to be wondered at that we find there, as we do find, a much richer diversity of diatoms, some of them perhaps locally evolved and some immigrants from other regions.

It would be a mistake to conclude from the foregoing that diatoms find an uncongenial home in the Arctic region. Although simplicity of structure and low number of species are characteristic of that locality the diatoms that do grow there flourish amazingly; so that in the matter of quantity few regions are as prolific of diatoms as the Arctic. Dr. Nansen and other explorers of the North Polar seas have recorded the unusually rich dredgings of diatom ooze secured there. The species adapted to a life in those frigid waters, with their long winters of night, are indeed few; but the fecundity of those that do grow there probably surpasses anything to be found in temperate or tropical regions. And in this respect any difference between Arctic and Antarctic diatoms wholly disappears; for in the Antarctic also the richness of the diatom ooze is startling and will impress anyone familiar only with material coming from temperate or tropical waters. This fact is deserving of the attention of all ecologists, because it is closely linked with the abundance of animal life inhabiting the northern and southern polar seas.

There will be found following each species in the list of diatoms here recorded one or more references to diatom literature. These have been so selected as to give the best descriptions and especially the best illustrations of the species in question; or in a few instances they refer to some figure which most accurately depicts that particular variation from the type form which is the one here discovered. This selection of references is necessary in fixing the forms here recorded because many figures in diatom publications are misnamed or, even more important, are so minute or so unreal in their markings as to be worthless. This is particularly true of illustrations made by early diatomists, to whom a sketchy suggestion of the diatom they were recording seemed to be quite satisfactory if it distinguished it from the comparatively few forms then known to the science. In consequence we find that to-day many of the figures and descriptions in these old works have become utterly valueless for purposes of identification, as for example, Ehrenberg, Agardh, Kützing, Nitzsch, etc. However, out of the most of these old named forms there have grown up quite definite concepts, the modern idea of the species; and it is to these later, sharply distinctive illustrations and descriptions that reference is here made.

In publications more modern than the foregoing we find much deplorable confusion introduced into diatom taxonomy because some authors have, on the one hand, assigned to the same species wholly different diatoms, or, on the other hand, have given new names to species already fixed. This has come about partly through carelessness but chiefly because of the rarity of so many important diatom publications. As the writer enjoys the advantage of being able to consult practically every work of value on this subject it seems worth while to correct in this paper some of these blunders by referring the reader, as above stated,

to those illustrations and descriptions which best record the characteristics of the species in question.

Only the species that are new or that show exceptional variations from the type forms are illustrated in this paper. The species recorded were collected by Mr. F. Johansen and the localities are as given in his field list of collecting stations.

The specimens of these new forms are deposited in the diatom collection of the United States National Museum, Washington, D.C., as well as nearly all the known species herein recorded. Each specimen is mounted separately on a properly labeled slide; so that the difficulty of finding the individual diatom named, so difficult to locate on the ordinary strewn slides, is wholly avoided. All the specimens in the Museum diatom collection are freely available for examination by interested diatomists.

The nomenclature followed in this report is that which has received the general approval of diatomists. It rejects some obscure names which a few authors claim to antedate and be synonymous with those in common use, such as, *Tessella* for *Rhabdonema*, etc. The author feels that sufficient doubt exists as to the generic boundaries of these archaic names to justify their abandonment to the oblivion in which they have long reposed, especially as much needless confusion must result if they now supplant the well known and classical names used in our most valuable diatom books. This is the position taken by Van Heurck, DeToni, Schmidt, Brun, and the majority of diatom writers. There is also a rejection here of the set of new generic names proposed by P. T. Cleve (see Cleve's *Naviculoid Diatoms*) for breaking up the huge genus *Navicula* into more compact divisions. The genus is unwieldy; but the writer agrees with the above mentioned diatomists that these proposed new genera are too misty in outline to be workable, useful as they may be for subgeneric grouping.

There is a chance of confusion in the record of the marine diatoms found by the Canadian Arctic Expedition because of a report already published on the fresh-water diatoms of the expedition. In it quite a number of marine diatoms are included. Its author, Mr. Charles W. Lowe, is careful to refer to this in his introductory remarks and to explain the reason for the mixed character of the diatom flora, as well as the fauna, found in some of the ponds and lagoons adjacent to the sea. He also notes the marine character of many of the species in his list. I find there are twelve marine species in the list which do not appear in the following enumeration, because the writer has found no specimens of them in any of the marine gatherings secured, and not having seen Mr. Lowe's specimens the following additions to my list are on his authority:

<i>Grammatophora angulosa</i> Ehr.	See vol. IV, Part A, page 36A of this report				
<i>Navicula Crabro</i> Ehr.	"	"	"	41A	" "
<i>Navicula Henedyi</i> W. Sm.	"	"	"	42A	" "
<i>Navicula humerosa</i> Breb.	"	"	"	42A	" "
<i>Nitzschia acuminata</i> (W.Sm.) Grun.	"	"	"	39A	" "
<i>Nitzschia lanceolata</i> W. Sm.	"	"	"	39A	" "
<i>Opephora Schwartzii</i> (Grun.) P. Petit	"	"	"	37A	" "
<i>Pleurosigma hippocampus</i> W. Sm.	"	"	"	43A	" "
<i>Stauroneis Gregorii</i> Ralfs	"	"	"	41A	" "
<i>Surirella fastuosa</i> Ehr.	"	"	"	40A	" "
<i>Surirella recedens</i> A. Sch.	"	"	"	40A	" "
<i>Surirella regina</i> Jan.	"	"	"	40A	" "

LIST OF COLLECTING STATIONS

NORTH PACIFIC

- 6b: Latitude 56° 26' N., long., 133° W., June 24, 1913.
Plankton-net on surface.
- 12b-c-d: Lat. 54° 38' N., long. 157° 45' W., June 30, 1913.
Plankton-net on surface.
- 13a-c: Lat. 54° 30' N., long. 159° 42' W., June 1, 1913.
Plankton-net at surface.

BERING SEA

- 18d: Off cape Romanzof, Alaska. Lat. 62° N., long. 167° 30' W., July 7, 1913. Plankton-net at surface.
- 20a: Teller (Grantley harbour), Alaska. Lat. 65° 15' N., long. 166° 30' W., July 30, 1913. Plankton-net at surface; water depth 2 fathoms.
- 20b-c: Same locality and date. Beam-trawl for 15 minutes, 2-3 fathoms.
- 20g: Port Clarence bay, near entrance to Grantley harbour, Aug. 4, 1913. 2-foot beam-trawl for 20 minutes in 2-3 fathoms. Sandy mud with algae.

ARCTIC OCEAN

- 21d-f: Off Cape Lisburne, Alaska. Lat. 68° 48' N., long. 165° 10' W. Aug. 16, 1913. Plankton-net at surface.
- 23: North of Blossom shoals, Alaska. Lat. 70° 24' N., long. 161° 25' W., Aug. 19, 1913. 4-foot beam-trawl for 20 minutes in 9-10 fathoms. Gray mud with many pebbles.
- 25b-c: Off Plover islands, 10 miles east of point Barrow, Alaska. Lat. 71° 20' N., long. 156° W., Aug. 27-28, 1913. Plankton-net at surface.
- 27s: Collinson point, Alaska. Lat. 69° 59' N., long., 144° 49' 47" W. October 3, 1913. 3 fathoms, sandy mud with algae.
- 29f: Beaufort sea, northeast of Alaska-Yukon International boundary. Lat. 70° 13' N., long., 140° 50' W., April 4, 1914. About 30 fathoms of water. From stomach of seals, *Phoca hispida* Schreber.
- 29g: Beaufort sea, northeast of Alaska-Yukon International boundary. Lat. 70° 20' N., long., 140° 20' W., April 6, 1914. Haul in ice, about 150 fathoms of water. Plankton-net vertical hauls.
- 32a: Martin point, Alaska. Lat. 70° 07' N., long., 143° W.
- 56a: Harrison bay, Alaska. Lat. about 70° 30' N., 150° W., Aug. 6, 1916. Plankton-net No. 3 at surface for 5 minutes.

DOLPHIN AND UNION STRAIT, NORTHWEST TERRITORIES

- 40d: Bernard harbour. Lat. 68° 47' N., long. 114° 50' 27" W. June 8, 1915. Plankton-net No. 3, vertical hauls from 3 fathoms up.
- 41: Bernard harbour. Outer harbour. 4-foot beam-trawl from ship for 45 minutes. 3-5 fathoms of water. Sandy mud with algae. July 20, 1915.
- 41b: Bernard harbour. Inner harbour, salmon nets in 2-3 fathoms. July 24, 1915.
- 41c: Bernard harbour, outer harbour. 2-foot square dredge for 20 minutes from motor-boat. 3-8 fathoms of water clay and gravel with algae.
- 42b: Bernard harbour, Inner harbour. Same locality as 41b. Sept. 1-2, 1915.
- 42x: Off Bernard harbour, Dec. 2, 1915. Water depth 16 feet. Tide-hole in ice. 3 vertical hauls with plankton-net, from surface to bottom.

- 43a: Off Cockburn point. Lat. $68^{\circ} 47' N.$, long. nearly $115^{\circ} W.$ Sept. 13, 1915. 4-foot beam-trawl. for 1 hour. About 50 fathoms of water, sandy mud with pebbles.
- 43b: Same as 43a. Sept. 14, 1915, and off Stapylton bay, 25-30 fathoms, 30 minutes trawling.
- 43c: West of Cockburn point, Sept. 14, 1915. 10-15 fathoms, sandy mud with many stones; 4-foot beam-trawl and $2' \times 4'$ square dredge for 1 hour.
- 43d: Locality and date as 43b.
- 43f: Locality and date as 43c.
- 43g: Bernard harbour, outer harbour. Oct. 30, 1915. Bottom sample; sandy mud.
- 46b: Off Bernard harbour, same locality as 42x, but on February 5, 1916.
- 50b: Stapylton bay, off Young point, N.W.T., Lat. $68^{\circ} 55' N.$ long., $116^{\circ} 52' W.$, July 17, 1916, about 10 fathoms of water. Plankton-net No. 3 at surface.

LIST OF SPECIES AND SYSTEMATIC DISCUSSIONS

Achnanthes Bory**Achnanthes arctica** (Cl.) Mann

Cleve Aret. Diat., Pl 4, fig. 22.

It is called *Achnanthidium arcticum* in the above reference. Cleve changes it into a variety of *Achnanthes brevipes* Ag. in Nav. Diat., II, p. 194, a doubtful assignment. Specimens were found in dredgings made at Stations 23 and 43a.

Achnanthes brevipes Ag.

Van Heurck Syn., Pl. 26, figs. 10-12.

Especially abundant in a dredging made in Dolphin and Union strait west of Cockburn point, Sept., 1915, Station 43c.

Achnanthes hyperborea Grun.

Grun. Diat. F. Jos. Land, Pl. 1, figs. 4-5.

Found in a dredging made at Station 43b.

Achnanthes parvula Kütz.

Van Heurck Syn., Pl. 26, figs. 25-28.

Found with the foregoing.

Achnanthes rhombica Ostr., var.

Pl. I, figs. 1-2; Ostr. Diat. N.E. Greenland, p. 215, Pl. 13, fig. 18.

My specimen agrees in general with this little known species, an illustration of which is here given, because the type figure differs somewhat and is in an obscure publication. The chief differences are that in my specimen there is no central hyaline area on the lower valve and its costae are far less flaring at the center; the form also is less angular. Incidentally my specimen is larger; length 0.041, width 0.014, 8.6 lines in 0.01 mm. (Ostrup's specimen having, length 0.034, width 0.012, 11 lines in 0.01 mm.). One specimen, Station 41, plankton haul.

Achnanthes subsessilis Kütz.

Van Heurck Syn., Pl. 26, figs. 21-24.

Found rather abundantly at Stations 23 and 43a.

Actinocyclus Ehr.**Actinocyclus curvatus** Jan.

Sch. Atlas, Pl. 57, fig. 31.

Found at Stations 23 and 43b. The form which Grunow has called *Coscinodiscus curvatus* var. *subocellatus* in his Diat. F. Jos. Land, Pl. 4, fig. 15, and which Rattray in his Rev. Actinocyclus, p. 145, makes *A. subocellatus* (Grun.) Ratt. may or may not be an *Actinocyclus*, according as its "pseudonodule" proves to be or not to be genuine; but to overthrow the specific name given by Janisch does not commend itself, seeing that the present species has an unmistakable pseudonodule and entirely lacks the distinctive border of Grunow's form.

Actinocyclus moniliformis Ralfs.

Van Heurck Syn., Pl. 124, fig. 9; W. Sm. Brit. Diat., Pl. 4, fig. 41, misnamed.

Found in only one dredging, Station 20g.

Actinoptychus Ehr.**Actinoptychus undulatus** Ehr.

Sch. Atlas, Pl. 1, figs. 1-4, 6.

More or less common throughout the dredgings, markedly so in those from Stations 20b, c, g, 23. The only example of this large marine genus found.

Amphiprora Ehr.**Amphiprora kryophila** Cl.

Cl. Vega Diat., Pl. 35, fig. 11.

Found at Station 23, a single specimen.

Amphiprora obtusa Greg. (in part), see **Tropidoneis Stauroptera** (Bail.) V. H.**Amphiprora paludosa** W. Sm.

Perag. Diat. France, Pl. 38, figs. 12-15.

Scarce in three dredgings made at Stations 20b-c, 27s and 41, and the variety called *punctulata* Grun. in Cl. and Grun. Arct. Diat., Pl. 4, fig. 84 also scarce in a plankton gathering made at Dolphin and Union strait.

Amphora Ehr.**Amphora angusta** Greg. var. **ventricosa** (Greg.) Cl.

Greg. Diat. Clyde, Pl. 12, fig. 68; see Cl. Nav. Diat., II, p. 135.

This is what Cleve called *A. lanceolata* Cl. in his Diat. Spitz., Pl. 23, fig. 2. It is somewhat plentiful in dredgings made at Stations 23, 27s, 43b and 43c.

Amphora angustissima Mann, nom. nov.

Van Heurck, Belgica Exp., Pl. 5, fig. 5; Perag. Antarc. Exp. France, Pl. 2, fig. 27, both misnamed.

This is identical with the two figures given above, both from the Antarctic. Van Heurck calls it *Amphora angusta* var. *angustissima* and Peragallo *Amphora lanceolata* var. *robusta*. It is radically distinct from both these species. I have given it the earlier of the two supplementary names, which has the advantage of suggesting the slight resemblance to *A. angusta*, to which it stands nearer than to *A. lanceolata*. Several specimens were found in the dredging made at Station 43g, between Chantry island and the mainland, Bernard harbour, Oct., 1915.

Amphora costata W. Sm.

W. Sm. Brit. Diat., Pl. 30, fig. 253.

It is doubtful if this can be united with *A. Erbi* Ehr., as De Toni proposes, that species being practically a *nomen nudum*. Found only in a dredging made at Station 23.

Amphora crassa Greg.

Sch. Atlas, Pl. 28, figs. 31-33.

The type form was found only at Stations 43b and 43c and was scarce; but the variety called *punctata* by Grunow was more abundant, occurring plentifully at Stations 20b-c, 27s, 43a and 43b.

Amphora cymbifera Greg.

Sch. Atlas, Pl. 25, figs. 17-19, 32-34, 36.

Found in dredgings made at Stations 23, 27s, 41, 43b, and the coarse form shown in figure 19 above at Station 41c.

Amphora egregia A. Sch.

Sch. Atlas, Pl. 28, figs. 13-15; Pl. 39, figs. 26, 31, misnamed.

Found only in one dredging, Station 23.

Amphora excludens Mann, sp. nov.

Pl. I, fig. 3; also Sch. Atlas Pl. 25, fig. 12, unnamed.

Valve very narrow, its ventral edge nearly straight but slightly incurved at the ends, its dorsal edge not arcuate but half-rhombic, the margin running nearly straight from the widest point at the middle to the pointed apices, these however curved ventrally like the beak of a bird; markings on dorsal side a narrow band of closely set rows of beading, decreasing in width to the apices, the rows radially inclined; on the ventral side a much narrower band of unbeaded costae, reverse-radially inclined; rhaps straight, near the ventral side, bisecting a wide median hyaline space, the outer ends of the rhaps curving with the beak-like apices.

Length 0.146 mm.; width 0.018 mm.; 7.7 lines on the dorsal and 8.5 on the ventral side in 0.01 mm.

This delicate species, with its dissimilar markings on the dorsal and ventral sides, is less angular in Schmidt's illustration than in the one made for this report; the position of the rhaps also is slightly different. Found only in a dredging made at Station 41, a single specimen.

Amphora Eulensteinii Grun.

Sch. Atlas, Pl. 25, figs. 1-3.

Cleve in Nav. Diat., II, p. 135, includes this under *A. angusta* Greg., an unsatisfactory change. Found at Stations 23 and 43c.

Amphora Gourdonii Perag.

Perag. Antare. Exp. France, Pl. 2, fig. 23.

Several specimens of this somewhat doubtful species were found at Station 43a.

Amphora laevis Greg.

Greg. Diat. Clyde, Pl. 12, fig. 72; Sch. Atlas, Pl. 26, figs. 3, 13.

Hardly to be united with *A. laevis* Greg., as is done by Cleve in Nav. Diat., II, p. 130. Found in one dredging, that made at Station 43b.

Amphora mexicana A. Sch.

Sch. Atlas, Pl. 27, fig. 47, also fig. 44, no name.

The above figure 44 from Spitsbergen should be included here. Found in dredging from Stations 43a, 43b, 43c and 43g.

Amphora obtusa Greg.

Sch. Atlas, Pl. 40, figs. 4-7, 11, 16-17.

R. abundant in the dredging made at Station 41.

Amphora ocellata Donk.

Micro. Journ., 1861, Pl. 1, fig. 11.

Very scarce in only one dredging, Station 20b-c.

Amphora ovalis Kütz.

Sch. Atlas, Pl. 26, figs. 106-111.

Common in several dredgings, Stations 20b-c, 23 and 41.

Amphora Proteus Greg.

Greg. Diat. Clyde, Pl. 13, fig. 81; Sch. Atlas, Pl. 27, figs. 2-3, 5, 6.

Unusually large specimens of the type form were found in dredgings made at Stations 20b-c, 27s, 43a, 43b, 43c, 43g; and the variety *Kariana* Grun. at Stations 41 and 43b.**Biddulphia** Gray**Biddulphia aurita** Breb.

Sch. Atlas, Pl. 122, figs. 1-8.

This cosmopolitan species occurs in most of the dredgings and is quite abundant in those from Stations 20b-c, 20g, 23 and 41.

Biddulphia Edwardsii Feb.

Van Heurck Syn., Pl. 100, figs. 9-10.

All the specimens were varieties of the true type and showed a tendency to merge into the next species. Found in dredgings from Stations 20g, 23 and 43b, and a plankton haul from Station 18d.

Biddulphia obtusa (Kütz.) Ralfs.

Van Heurck Syn., Pl. 100, figs. 11-14.

Small specimens and as a rule having the form shown in fig. 13 above. Found at Stations 20b-c and 20g, very abundant in the latter.

Biddulphia polymorpha (Kütz.) Mann.

Van Heurck Syn., Pl. 104, figs. 3-4.

Much confusion exists about the form of this diatom because several authors have united it with *B. laevis* without distinguishing between *B. laevis* Ehr. and *B. laevis* W. Sm., it being the same as the latter but clearly different from the former. As the old genus *Cerataulus* cannot be kept distinct from *Biddulphia* this species is here reclassified. Found in dredging from Station 41.**Biddulphia Roperiana** Grev.

Van Heurck Syn., Pl. 99, figs. 4-6; Sch. Atlas, Pl. 120, figs. 20-24, especially last.

Found in dredgings from Stations 20g, 23, 43a and 43g, and a spiny variety at Station 20b-c.

Campylodiscus Ehr.**Campylodiscus angularis** Greg.

Greg. Diat. Clyde, Pl. 11, fig. 53; Deby Camp., Pl. 3, fig. 22.

Found sparingly in dredgings from Stations 27s, 41, 43a, and 43c.

Campylodiscus striolatus Grun.

Sch. Atlas, Pl. 53, figs. 1-2.

Deby, in general a good authority on this genus, gives a figure of this species but calls it *C. Kutzingii* Bail., see his Rev. Camp., Pl. 1, fig. 10. De Toni in Syl. Alg., p. 610, quotes this without indorsement. If the foregoing figures are compared with Bailey's form figured in Wilkes Exp., Pl. 9, fig. 20, and the description read on p. 178, it will be clear the two cannot be united. Found in dredgings from Stations 20b-c, 23, and 43g, not abundant.

Campylodiscus Thuretil Breh.

Van Heurck Syn., Pl. 77, fig. 1; compare Micro. Journ., 1857, Pl. 1, fig. 41.

Schmidt states in his Atlas Pl. 17 that according to Grunow this species was proven by Brebisson to include *C. simulans* Greg. (see second reference above), and the two are generally united. Deby however keeps them separate, figuring both in his Rev. Camp., Pl. 7, where they are quite dissimilar. But most authors also include here *C. parvulus* W. Sm., which, if the same, should replace both the other names. Without access to the actual specimens I must follow the general nomenclature. Certainly Brebisson's original figure in Diat. Cherbourg, Pl. 1, fig. 3, is unlike any of these.

In most of the dredgings, particularly from Stations 23, 41, 43b, 43c, 43g.

Chaetoceros Ehr.**Chaetoceros atlanticum** Cl.

Gran Nord. Plankt., p. 64, fig. 74, Sch. Atlas, Pl. 337, figs. 1-2.

Present in most of the plankton hauls, especially from Stations 12d, 13a-c, 18 18d, 40d, and 56a.

Chaetoceros boreale Bail.

Gran Nord. Plankt., p. 73, fig. 87, Sch. Atlas, Pl. 325, figs. 5-6.

Found only in the plankton haul from Station 13a-c.

Chaetoceros constrictum Gran.

Gran Nord. Plankt., p. 80, fig. 96; Sch. Atlas, Pl. 338, fig. 1.

Found at Stations 6b and 12d, scarce in both.

Chaetoceros criophilum Cast.

Sch. Atlas, Pl. 342, figs. 1-3; Gran Nord. Plankt., p. 71, fig. 85, rather poor.

This shares with *C. decipiens* Cl. in being most abundant in the plankton material examined. Found especially abundant at Stations 6b, 12d, 13a-c, 25b-c and 40d.

Chaetoceros decipiens Cl.

Gran Nord. Plankt., p. 74, fig. 88; Sch. Atlas, Pl. 321, fig. 20 and Pl. 343, figs. 17-18.

The most abundant of all the species found; especially noted at Stations 6b, 12d, 13a-c, 25b-c, 40d, 42x and 56a.

Chaetoceros Diadema (Ehr.) Cl.

Gran Nord. Plankt., p. 84, fig. 102; Van Heurck Syn., Pl. 82 bis, fig. 6.

Only the endocysts of this species were found, and in only one gathering, Station 56a, a plankton haul.

Chaetoceros aciniosum Schutt.

Gran Nord. Plankt., p. 82, fig. 99.

Found at Stations 12d and 25b-c, not abundant.

Chaetoceros Mitra (Bail.) Cl.

Gran Nord. Plankt., p. 75, fig. 89.

This is called *Dicladia Groenlandicus* by Cleve in his Aret. Diat., Pl. 2, fig. 10. Found sparingly at Stations 6b and 12d, and in the dredging from Station 43c.

Chaetoceros pelagicum Cl.

Gran Nord. Plankt., p. 84, fig. 101; Sch. Atlas Pl. 343, fig. 1.

Found only at Station 12d. It is thought by some to be a summer phase of *C. lacinosum* Schutt.

Cocconeis Ehr. (emend. Grun.)**Cocconeis arcta A. Sch.**

Sch. Atlas, Pl. 191, fig. 1.

The type locality is unknown, Schmidt merely saying "Gazelle Expedition." It is a somewhat questionable member of this genus. Found in dredging from Station 43b, scarce.

Cocconeis kamchatkiensis Mann, sp. nov.

Pl. I, fig. 4; see also Sch. Atlas, Pl. 191, figs. 40, 42-43, unnamed.

Valve a perfect and broad ellipse with neither angular nor protruding apices; upper valve having a strong marginal band of coarsely beaded costae, equally wide around the entire valve, there being three beads in each row; pseudo-rhaphé line evident, bordered on each side by a straight row of closely set beads, outside of which are two to three rows of similar beads which are, however, progressively curved and the beads more loosely and irregularly set, producing thereby a wavy appearance, a considerable space between the outer of these rows and the compact marginal band; under valve unidentified.

Length 0.043 mm., width 0.029 mm., 10 lines in 0.01 mm. in marginal band.

By comparing the illustration of this species here given with Schmidt's figures mentioned above, and for which he recognized there was no name, a close resemblance will be seen. The suggestion of Cleve to group these under *C. Scutellum* Ehr. is rightly rejected by Schmidt. In fact Cleve's assembly of forms under *C. Scutellum* in his Nav. Diat., II, pp. 170-171, is a hodge-podge without boundaries. Nor can they be united with the fossil *C. antiqua* of Brun (Diat. Jap., Pl. 8, fig. 5), a loosely dotted species with a wide central area that always shows a unique onesidedness. It may be added, this species somewhat resembles *C. arctica* (l. in Vega Diat., Pl. 35, fig. 4a, a form with a decidedly sigmoid rhaphé and pseudorhaphé. Found in two dredgings, Stations 23 and 43b.

Cocconeis paniformis Br.

Sch. Atlas, Pl. 189, figs. 16-21.

This is one of the species which, as just stated, Cleve arbitrarily puts into *C. Scutellum*. Found in dredging from Station 41.

Cocconeis Scutellum Ehr.

Sch. Atlas, Pl. 191, figs. 17-27.

An extremely cosmopolitan diatom in both fossil and recent deposits. More or less represented in most of the dredgings, abundant at Stations 41 and 41c.

Coscinodiscus Ehr.**Coscinodiscus Asteromphalus Ehr.**

Sch. Atlas, Pl. 63, fig. 12; Van Heurck Syn., Pl. 130, figs. 1-2, 5-6.

This species, rather characteristic of arctic waters, was surprisingly scarce in the dredgings examined and all the specimens were smaller and more delicate than the type, thereby approaching *C. Oculus-Iridis* Ehr. which is classed as a variety of *C. Asteromphalus* by many authors. Frequent only at Station 43a.

Coscinodiscus concinnus W. Sm.

Sch. Atlas, Pl. 114, figs. 8-9.

All specimens were small forms with coarse areolation, very unlike the type structure. The two marginal processes set about 2.5 of the circumference apart, characteristic of this species, were above the usual size. Found in only one dredging, from Station 13a, but generally present in the plankton hauls, particularly from Stations 6b, 20a, 42x and 46b.

Coscinodiscus curvatus Grun.

Sch. Atlas, Pl. 57, fig. 30; Grun. Diat. F. Jos. Land, Pl. 4, figs. 9, 11-14.
At two stations, Nos. 41 and 43g.

Coscinodiscus decrescens Grun. var. **repleta** Grun.

Grun. Diat. F. Jos. Land, Pl. 3, fig. 18.

Judging from Grunow's figure this is too wide from the normal form to be a good variety. Found in dredgings at Station 23.

Coscinodiscus excentricus Ehr.

Sch. Atlas, Pl. 58, figs. 46-49, the last the type form.

Widely distributed in the Arctic, in fact cosmopolitan. Found in dredgings at Stations 43a and 43g, and a plankton haul from Station 25b-c, all in considerable abundance.

Coscinodiscus heteroporus Ehr., var. (?)

Sch. Atlas, Pl. 61, fig. 4.

A species of doubtful worth. Found in a plankton haul at Station 43f.

Coscinodiscus kryophilus Grun.

Grun. Diat. F. Jos. Land, Pl. 3, fig. 21.

In only one dredging and there infrequent, Station 29g.

Coscinodiscus Kützingeri A. Sch.

Sch. Atlas, Pl. 57, figs. 17-18; Sch. Nordsee Diat., Pl. 3, fig. 35, misnamed.
Found only in dredging made at Station 43a.

Coscinodiscus limbatus (Ehr.) A. Sch.

Sch. Atlas, Pl. 65, fig. 7; Ehr. Mikro., Pl. 20, fig. 29.

There is confusion about this species. Grunow would unite it with *C. radiatus* Ehr., and De Toni puts it under *C. marginatus* Ehr. See discussion in Schmidt above. Found only at Station 29g.

Coscinodiscus lineatus Ehr.

Sch. Atlas, Pl. 59, figs. 27-30; Van Heurck Syn., Pl. 131, fig. 3. Found sparingly at Stations 43a and 43b, and the doubtful variety called *C. blandus* A. Sch. in his Atlas, Pl. 59, figs. 35-37, at Station 41. I have specimens of this diatom from the Gulf of Mexico in which one valve is like Schmidt's figures and the other exactly like *C. lineatus*.

Coscinodiscus marginatus Ehr.

Sch. Atlas, Pl. 62, figs. 1-6.

Greville's *C. robustus*, generally united with this species, proves to be a wholly different diatom, an *Endictya*. Found in dredging at Station 23, and in a plankton haul, Station 43f.

Coscinodiscus nitidus Greg.

Sch. Atlas, Pl. 58, figs. 17-19.

One broken specimen at Station 23.

Coscinodiscus nobilis Grun.

Jour. Roy. Mic. Soc., 1879, Pl. 21, fig. 1; Jan. Gaz. Exp., Pl. 6, fig. 13.

The figure by Janisch above is the only good one of this large and delicately marked diatom. Found at Station 20b-c; so far as I know not found previously north of England. The locality of the *Gazelle* specimen is not given.

Coscinodiscus Oculus-Iridis Ehr.

Sch. Atlas, Pl. 60, fig. 13.

The specimens were close to *C. pacificus* Ratt., but as Grunow suggests (Denk. Wien. Akad., 1884, p. 77) this should be classified *C. Oculus-Iridis*, var. *pacificus*. Found at Stations 23 and 29g.

Coscinodiscus Payeri Grun.

Grun. Diat. F. Jos. Land, Pl. 3, figs. 12-14.

Found only at Station 23, there rather frequent.

Coscinodiscus polycanthus Grun. var. **baltica** Grun.

Grun. Diat. F. Jos. Land, Pl. 3, fig. 17.

Found only at Station 20b-c.

Coscinodiscus radiatus Ehr.

Grun. Diat. F. Jos. Land, Pl. 3, fig. 1.

The specimens were the variety which Grunow calls *glacialis* on the above plate and var. *borealis* on p. 72. Found at Stations 23 and 43b.**Coscinodiscus radlosus** Grun.

Jan. C. z. Exp., Pl. 5, fig. 9; Sch. Nordsee Diat., Pl. 3, fig. 42, no name.

The above are identified in Ratt. Rev. Cose., p. 521. Found at Station 29g.

Coscinodiscus septentrionalis Grun.

Grun. Diat. F. Jos. Land, Pl. 4, fig. 33.

Grunow expresses doubt of this being a variety of *C. lacustris* Grun., which latter is probably a *Cyclotella*. Abundant in many of the dredgings, particularly at Stations 20b-c, 23, 41, 41c, 43a, 43b and 43c.**Coscinodiscus subglobosus** Cl. and Grun.

Grun. Diat. F. Jos. Land, Pl. 4, figs. 19-20; Sch. Atlas, Pl. 58, fig. 44, unnamed.

This is a strictly Arctic species. Found in dredging at Station 43b.

Coscinodiscus subtilis Ehr.

Sch. Atlas, Pl. 57, figs. 11-16.

A species of universal distribution and great variability. Found at Stations 23, 27s, 43a and 43b.

Coscinodiscus tuberculatus Grev.

Sch. Atlas, Pl. 57, figs. 40-42; Grun. Diat. F. Jos. Land, Pl. 3, fig. 29.

Grunow expresses doubt of his specimen from Franz Josef land being this species because it had hitherto been found only in a fossil state. The discovery of it here confirms Grunow's identification. Found at Station 29g.

Coscinodiscus tuuiformis Temp. and Brun.

Temp. and Brun. Diat. Jap., Pl. 7, fig. 6.

I suspect this to be nothing but a small, robust specimen of *C. marginatus* Ehr. with a very wide girdle. I have found it frequently in cold marine waters as well as here. Found in a plankton haul, Station 43f.**Cymbella** Ag.**Cymbella arctica** Lager.

Sch. Atlas, Pl. 10, fig. 12.

The type specimen was found at Spitz-bergen; those found here agree perfectly with the type. Station 27s.

Cymbella gastroides Kütz.

Sch. Atlas, Pl. 9, figs. 1-2; Grun. Diat. F. Jos. Land, Pl. 1, fig. 7.

This species occurs recent and fossil, fresh-water and marine. Found in a dredging at Station 23.

Denticula (Kütz.) Grun.**Denticula elegans** Kütz.

Van Heurck Syn., Pl. 49, figs. 14-16.

Normally fresh-water, this species also occurs in brackish and marine gatherings. Found in chains of eight or more frustules in a plankton haul from Station 43f.

***Denticula tenuis* Kütz.**

Van Heurck Syn., Pl. 49, figs. 23, 28-30.

Although, like the preceding, this fresh-water species occurs in marine gatherings it probably gets there as detritus washed down from adjacent fresh-water areas. Found also at Station 43f.

***Diatoma* (DC.) Heib.**

***Diatoma tenue* (Ag.) Kütz.**

Van Heurck Syn., Pl. 50, figs. 14, 19.

Found only in plankton haul from Station 21d-f.

***Eunotia* Ehr.**

***Eunotia praerupta* Ehr. var. *laticeps* Grun.**

Cl. and Grun. Aret. Diat., Pl. 7, fig. 123.

The specimens exactly duplicate the above figure. Found in dredging from Station 23.

***Fragilaria* Lyngh.**

***Fragilaria islandica* Grun.**

Gran Nord. Plankt., p. 114, fig. 153; Van Heurck Syn., Pl. 45, fig. 37.

Found in plankton hauls from Stations 12b-c, 18d and 46b; in the first it is very abundant, composing almost the entire plankton.

***Glyphodesmis* Grev.**

***Glyphodesmis interspiralis* Brun. (?)**

Pl. I, fig. 5. See *Le Diat.*, I, Pl. 24, fig. 10.

By comparing the figure here given with the one in *Le Diatomist* the almost identical appearance of the two will be seen; but as this species has never before been found except in fossil beds at Carmacks and Totara, New Zealand, one cannot but question their identity. Of course there are many fossil forms found also in a living state, e.g., *Naricula Schultzii*, but the separation of these two geographically, as well as chronologically, is exceptional. A certain specious resemblance exists between this diatom and figures of the so-called "*Homocladia Martiana* Ag.," as in *Prit. Inf.*, Pl. 4, fig. 24, and *W. Sm. Brit. Diat.*, Pl. 55, fig. 347; but that is a *Nitzschia*, a quite delicate diatom, well shown in *H. L. Sm. Types*, No. 198. Found only in a dredging from Station 43c, a single specimen.

***Gomphonema* Ag.**

***Gomphonema exiguum* Kütz.**

Van Heurck Syn., Pl. 25, figs. 34-39.

Found in plankton hauls from Station 43f.

***Gomphonema groenlandicum* Ostr.**

Sch. Atlas, Pl. 213, fig. 40.

Found in two dredgings, from Stations 23 and 43c.

***Goniothecium* Ehr.**

***Goniothecium Odontella* Ehr.**

Ehr. Mikro., Pl. 18, fig. 94; *Prit. Infus.*, Pl. 6, fig. 27.

Generally fossil; found at Station 27s.

Grammatophora Ehr.**Grammatophora arctica Cl.**

Van Heurck Syn., Pl. 53 bis., fig. 3.

This is the same as *G. antarctica* Perag. in Antaret. Exp. France, Pl. 4, fig. 12. Found at Stations 20b-c and 23.

Grammatophora arcuata Ehr.

Perag. Antaret. Exp. France, Pl. 3, fig. 25; Ehr. Mikro., Pl. 33A, sec. 23, fig. 11.

More or less plentiful in many of the dredgings, especially in those from Stations 43a and 43g.

Grammatophora islandica Ehr.

Van Heurck Syn., Pl. 53, fig. 7.

Probably a variety of *G. angulosa* Ehr. Found at Stations 43a and 43b.

Grammatophora marina Kütz.

Van Heurck Syn., Pl. 53, figs. 9-13.

Found in the dredging at Station 20g and the plankton haul at Station 12d.

Grammatophora oceanica Ehr. var. macilenta W. Sm.

Perag. Diat. France, Pl. 87, fig. 16.

The markings on this species are exceptionally fine. Found only in the dredging from Station 27a.

Grammatophora subundulata Grun.

Van Heurck Syn., Pl. 53 bis., fig. 10.

Placed by some authors as a variety of *G. marina*. Found only in the dredging from Station 43b.

Hantzschia Grun.**Hantzschia amphioxys (Ehr.) Grun.**

Van Heurck Syn., Pl. 56, figs. 1-6.

The grounds for separating this from the genus *Nitzschia*, namely its having the heavy carinal markings on the same side instead of on opposite sides of the two valves of the individual diatom, is insufficient, but it makes for easier identification and may therefore be accepted. The present species is generally fresh-water but seems to thrive in marine localities. Found only at Station 41.

Hyalodiscus Ehr.**Hyalodiscus hormoides (Mont.) Petit.**

Van Heurck Syn., Pl. 84, figs. 3-4; Grun. Diat. F. Jos. Land, Pl. 5, fig. 32.

Grunow without apparent justification names his figure var. *glacialis*; this Grun turns into *Lauderia glacialis* (Grun Nord. Plankt., p. 23, fig. 23), and Jorgensen (Jorg. Protist Plankt., Pl. 6, fig. 7) calls it *Podosira glacialis*. Without seeing Grun's specimens one cannot find a good excuse for making this a *Lauderia*. De Toni (Syl. Alg., p. 1361) says it is what is named *Hyalodiscus maximus* var. *arctica* in Cl. and Grun. Types No. 1. Found rather abundantly at Stations 20b-c, 23, 43b and 43c; also what may be a small variety corresponding to the figure in Sch. Diat. Nordsee, Pl. 3, fig. 40, there confused with "*Podosira hormoides* W. Sm." which is *H. scoticus* (Kütz.) Grun. Compare with Van Heurck Syn., Pl. 84, figs. 7-8; this small variety occurring at Stations 41 and 43a.

Hyalodiscus laevis Ehr.

Ehr. Mikro., Pl. 33, sec. 15, fig. 17.

Typical specimens were found at Station 43c.

***Hyalodiscus scoticus* (Kütz.) Grun.**

Van Heurck Syn., Pl. 84, figs. 15-18; Sch. Diat. Nordsee, Pl. 3, fig. 27, misnamed.

Found at Stations 20b-c, 20g, 41, 43b and 43c, abundant.

***Hyalodiscus subtilis* Bail.**

Bail. New Spec., Pl. 1, fig. 12; Prit. Inf., Pl. 5, fig. 60, good figure.

Found at Stations 42b and 43a, scarce in both.

Licmophora* Ag.**Licmophora Lyngbyei* (Kütz.) Grun.**

Van Heurck Syn., Pl. 47, fig. 15.

The specimens were all the unimportant variety called var. *Pappiana* Grun. in the above reference. Although the markings are coarse they are shallow and therefore obscure. Found in plankton haul made at Station 43f.

***Licmophora tenuis* (Kütz.) Grun.**

Van Heurck Syn., Pl. 48, fig. 21; W. Sm. Brit. Diat., Pl. 24, fig. 229, misnamed.

Found in plankton haul made at Station 50b.

Mastoglola* Thwaites.**Mastoglola Braunii* Grun.**

Van Heurck Syn., Pl. 4, figs. 21-24.

Found only at Station 20b-c and there scarce.

***Mastoglola Grevillei* W. Sm.**

Van Heurck Syn., Pl. 4, fig. 20 (compare fig. 18).

M. Grevillei is a fresh-water species; this and the similarity or identity which some forms show with *M. Danseli* Thw., a brackish and marine species, suggests the specimens found may belong to the latter. In a plankton haul from Station 21d-f.

Melosira* Ag.**Melosira granulata* (Ehr.) Ralfs.**

Sch. Atlas, Pl. 181, figs. 57-65.

Rather plentiful at Station 20c.

***Melosira Heribaudii* Brun.**

Sch. Atlas, Pl. 182, fig. 23.

Very abundant in dredging from Station 43b.

***Melosira hyperborea* Grun.**

Van Heurck Syn., Pl. 85, figs. 3-4; Gran Nord Plankt., p. 13, fig. 4.

Found in three plankton hauls, from Stations 12b-c, 20a and 40d.

***Melosira Jurgensii* Ag.**

Sch. Atlas, Pl. 182, figs. 16, 27-31.

Found at Stations 20b-c, 41, 45a and 43c.

***Melosira nummuloides* (Bory) Ag.**

Sch. Atlas, Pl. 182, figs. 1-2; Van Heurck Syn., Pl. 85, fig. 1.

Found in one dredging, from Station 43c, and in three plankton hauls, Stations 20a, 40d and 46b.

***Melosira sulcata* (Ehr.) Kütz.**

Van Heurck Syn., Pl. 91, figs. 15-18, 22-24.

Placed by many authors in a separate genus, *Paralia*. Found at Stations 20b-c, 20g, 23 and 43a.

Melosira Westii W. Sm.

Van Heurck Syn., P. 91, figs. 11-12.

Found only at Station 43b, there rather plentiful.

Navicula Bory**Navicula abbreviata** Grun.

Cl. and Grun. Aret. Diat., Pl. 2, fig. 43.

Found only at Station 43c, scarce.

Navicula algida Grun.

Diat. F. Jos. Land, Pl. 1, fig. 31.

Found in dredgings from Stations 23 and 43a, and in a plankton haul from Station 29g.

Navicula aspera Ehr.

Grun. Diat. F. Jos. Land, Pl. 1, fig. 20.

This is by far the most abundant species found, some of the many varietal phases being present in nearly every gathering, often in great quantity. The most prominent form is the large variety called *N. aspera* var. *intermedia* Grun. and figured in the above reference. Especially common at Stations 23 and 27s.

Navicula Baculus Cl.

Cl. Vega Diat., Pl. 37, fig. 51.

This should not be considered to be a variety of *N. inconspicua* Greg. Found only at Station 29g.

Navicula Baileyana Grun.

Sch. Atlas, Pl. 6, figs. 26-27; Sch. Diat. Nordsee, Pl. 1, fig. 31.

The type form occurs at Stations 20b-c and 23, and a variety at 23.

Navicula bipustulata Mann, sp. nov.

Pl. I, fig. 6; also Sch. Atlas, Pl. 46, fig. 67.

Valve linear, quite convex, the rounded apices ending in globular tips; costae absent at the middle, thereby leaving a wide stauros, at first radial and strongly bowed, becoming transverse and straight at the apices, very faintly cross-barred; rhapec median at the centre but becoming slightly lateral at the apices.

Length 0.047 mm., width 0.008 mm., 8.5 lines in 0.01 mm.

Possibly this is the same as the unnamed figure in Sch. Atlas above, which subsequently Grunow suggests is a variety of *N. cancellata* Donk., to which it has practically no resemblance; see Donk. Brit. Diat., Pl. 8, fig. 4. Cleve accepts this with a varietal name, *subapiculata*. To illustrate the muddled group that Cleve unites under *N. cancellata*, compare *N. truncata* Donk. in Mic. Journ., 1861, Pl. 1, fig. 4a-b and *N. retusa* Donk. in fig. 17a-b same plate. When such dissimilar species are called by the same name diatom taxonomy loses all value. Found at Station 23.

Navicula bomboides A. Sch.

Sch. Atlas, Pl. 13, fig. 29.

Found at Stations 20b-c and 43a.

Navicula Bombus Ehr.

Sch. Atlas, Pl. 13, figs. 5, 6, 9.

Found only at Station 43a and rather scarce.

Navicula brevis Greg.

Sch. Diat. Nordsee, Pl. 2, figs. 14, 15.

Found at Stations 20b-c, 23, 41, 41c and 43g.

Navicula cancellata Donk. var. **minuta** Grun.

Cl. and Grun. Aret. Diat., Pl. 2, fig. 42.

This is hardly a good variety of *N. cancellata*. Found at Station 20b-c.

Hyalodiscus scoticus (Kütz.) Grun.

Van Heurck Syn., Pl. 84, figs. 15-18; Sch. Diat. Nordsee, Pl. 3, fig. 27, misnamed.

Found at Stations 20b-c, 20g, 41, 43b and 43c, abundant.

Hyalodiscus subtilis Bail.

Bail. New Spec., Pl. 1, fig. 12; Prit. Inf., Pl. 5, fig. 60, good figure.

Found at Stations 42b and 43a, scarce in both.

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Van Heurck Syn., Pl. 47, fig. 15.

The specimens were all the unimportant variety called var. *Pappeana* Grun. in the above reference. Although the markings are coarse they are shallow and therefore obscure. Found in plankton haul made at Station 43f.

Licmophora tenuis (Kütz.) Grun.

Van Heurck Syn., Pl. 48, fig. 21; W. Sm. Brit. Diat., Pl. 24, fig. 229, misnamed.

Found in plankton haul made at Station 50b.

Mastogloia Thwaites.**Mastogloia Braunii** Grun.

Van Heurck Syn., Pl. 4, figs. 21-24.

Found only at Station 20b-c and there scarce.

Mastogloia Grevillei W. Sm.

Van Heurck Syn., Pl. 4, fig. 20 (compare fig. 18).

M. Grevillei is a fresh-water species; this and the similarity or identity which some forms show with *M. Danseii* Thw., a brackish and marine species, suggests the specimens found may belong to the latter. In a plankton haul from Station 21d-f.

Melosira Ag.**Melosira granulata** (Ehr.) Ralfs.

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Rather plentiful at Station 29g.

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Van Heurck Syn., Pl. 85, figs. 3-4; Gran Nord Plankt., p. 13, fig. 4.

Found in three plankton hauls, from Stations 12b-c, 20a and 40d.

Melosira Jurgensii Ag.

Sch. Atlas, Pl. 182, figs. 16, 27-31.

Found at Stations 20b-c, 41, 43a and 43c.

Melosira nummuloides (Bory) Ag.

Sch. Atlas, Pl. 182, figs. 1-2; Van Heurck Syn., Pl. 85, fig. 1.

Found in one dredging, from Station 43c, and in three plankton hauls, Stations 20a, 40d and 46b.

Melosira sulcata (Ehr.) Kütz.

Van Heurck Syn., Pl. 91, figs. 15-18, 22-24.

Placed by many authors in a separate genus, *Paralia*. Found at Stations 20b-c, 20g, 23 and 43a.

Melosira Westli W. Sm.

Van Heurck Syn., Pl. 91, figs. 11-12.

Found only at Station 43b, there rather plentiful.

Navicula Bory**Navicula abbreviata** Grun.

Cl. and Grun. Arct. Diat., Pl. 2, fig. 43.

Found only at Station 43c, scarce.

Navicula algida Grun.

Diat. F. Jos. Land, Pl. 1, fig. 31.

Found in dredgings from Stations 23 and 43a, and in a plankton haul from Station 29g.

Navicula aspera Ehr.

Grun. Diat. F. Jos. Land, Pl. 1, fig. 20.

This is by far the most abundant species found, some of the many varietal phases being present in nearly every gathering, often in great quantity. The most prominent form is the large variety called *N. aspera* var. *intermedia* Grun. and figured in the above reference. Especially common at Stations 23 and 27s.**Navicula Baculus** Cl.

Cl. Vega Diat., Pl. 37, fig. 51.

This should not be considered to be a variety of *N. inconspicua* Greg. Found only at Station 29g.**Navicula Baileyana** Grun.

Sch. Atlas, Pl. 6, figs. 26-27; Sch. Diat. Nordsee, Pl. 1, fig. 31.

The type form occurs at Stations 20b-c and 23, and a variety at 23.

Navicula bipustulata Mann, sp. nov.

Pl. I, fig. 6; also Sch. Atlas, Pl. 46, fig. 67.

Valve linear, quite convex, the rounded apices ending in globular tips; costae absent at the middle, thereby leaving a wide stauros, at first radial and strongly bowed, becoming transverse and straight at the apices, very faintly cross barred; rhabpe median at the centre but becoming slightly lateral at the apices.

Length 0.047 mm., width 0.008 mm., 8.5 lines in 0.01 mm.

Possibly this is the same as the unnamed figure in Sch. Atlas above, which subsequently Grunow suggests is a variety of *N. cancellata* Donk., to which it has practically no resemblance; see Donk. Brit. Diat., Pl. 8, fig. 4. Cleve accepts this with a varietal name, *subapiculata*. To illustrate the muddled group that Cleve unites under *N. cancellata*, compare *N. truncata* Donk. in Mic. Journ., 1861, Pl. 1, fig. 4a-b and *N. retusa* Donk. in fig. 17a-b same plate. When such dissimilar species are called by the same name diatom taxonomy loses all value. Found at Station 23.**Navicula bomboides** A. Sch.

Sch. Atlas, Pl. 13, fig. 29.

Found at Stations 20b-c and 43a.

Navicula Bombus Ehr.

Sch. Atlas, Pl. 13, figs. 5, 6, 9.

Found only at Station 43a and rather scarce.

Navicula brevis Greg.

Sch. Diat. Nordsee, Pl. 2, figs. 14, 15.

Found at Stations 20b-c, 23, 41, 41c and 43g.

Navicula cancellata Donk. var. *minuta* Grun.

Cl. and Grun. Arct. Diat., Pl. 2, fig. 42.

This is hardly a good variety of *N. cancellata*. Found at Station 20b-c.

Navicula Claviculus Greg.

Greg. Diat. Clyde, Pl. 9, fig. 5; Sch. Atlas, Pl. 2, fig. 28.

Found in dredging at Station 41, and plankton haul, Station 12d.

Navicula Cluthensis Greg.

Cl. and Grun. Arct. Diat., Pl. 2, fig. 49; Cl. N. and R. Diat., Pl. 2, fig. 13.

Two varieties represented by the above references; var. *finmarchiana* Grun. found at Station 41, and var. *maculifera* Cl., at Station 43c.

Navicula compressicauda A. Sch.

Sch. Atlas, Pl. 46, fig. 62; Sch. Nordsee Diat., Pl. 2, fig. 35.

Found at Station 43a. A very rare species.

Navicula consimilis A. Sch.

Sch. Nordsee Diat., Pl. 2, fig. 46.

Strictly typical forms at Station 41c.

Navicula controversa Mann, nom. nov.

Pl. I, fig. 7.

Valve panduriform but only slightly constricted at the middle, thus closely resembling in outline *N. didyma*; rows of beading radiately arranged throughout, becoming arcuate toward the two apices; the beads in each row widely separated and appearing to be strung on thread-like lines, two to four beads in each row and all near to the outer margin, thereby leaving only the thread-like lines to continue to the middle; raphe strong, straight, bisecting the wide fusiform median area; central nodule rectangular.

Length 0.079-0.110 mm., width 0.028-0.040; 4.7 to 6 lines in 0.01 mm.

This is identical with the figure in Cl. and Grun. Arct. Diat., Pl. 3, fig. 54 there mis-called *N. bomboides* var. *media* (see Sch. Atlas, Pl. 13, figs. 36-38) and subsequently figured in Grun. Diat. F. Jos. Land, Pl. 1, figs. 38-39, there mis-called *N. subcineta* A. Sch. (see Sch. Atlas, Pl. 13, fig. 41 and Pl. 69, fig. 32). It is abundant in some arctic dredgings, especially at Station 43d. I have found it also in material of the Shackleton South Polar Expedition, and identical with the northern specimens except that it averages larger.

Navicula cruciata Cl.

Cl. N. and R. Diat., Pl. 1, fig. 11.

Cleve's type form came from Greenland. Found at Station 43b.

Navicula didyma Ehr.

Sch. Atlas, Pl. 13, fig. 2; Sch. Nordsee Diat., Pl. 1, fig. 7.

Not at all plentiful; found at Station 43c.

Navicula directa W. Sm.

Sch. Atlas, Pl. 47, figs. 3-5; W. Sm. Brit. Diat., Pl. 18, fig. 172.

Found in dredgings from Stations 20b-c, 23, 41, 43a and 43b, and in plankton haul at Station 18d, and generally abundant in all.

Navicula distans (W. Sm.) Ralfs.

W. Sm. Brit. Diat., Pl. 18, fig. 169.

Schmidt's figures of this species in Atlas, Pl. 46, figs. 11-14, are poor. Found only at Station 23.

Navicula elliptica Kütz.

Sch. Atlas, Pl. 7, figs. 29-32.

This normally fresh-water species has been reported several times in brackish dredgings. *N. subovalis* Cl. in Nav. Diat., I, Pl. 1, fig. 27, is a very similar form of truly marine habitat, but having been found only in New Zealand this Arctic species is probably the above. Found at Station 20g.

Navicula elongata Grun.

Sch. Nordsee Diat., Pl. 2, fig. 42; Sch. Atlas, Pl. 50, fig. 27 (not 28-29).

There is doubt of this being able to stand alone; Cleve claims it is a variety of *N. Liber* W. Sm. Found at Stations 20b-c and 23.

Navicula erosa Cl.

Sch. Atlas, Pl. 259, fig. 7.

Found only at Station 43a and scarce.

Navicula Eudoxia A. Sch.

Sch. Atlas, Pl. 8, figs. 39-40; Pl. 70, fig. 71.

I dissent from Cleve's making this a variety of *N. contigua* A. Sch., the type figure of which is fig. 43 in the above, and his suggestion that all are small, corroded specimens of *N. gemmata* Grev. is absurd. Found at Stations 23, 43a and 43g.

Navicula exemta A. Sch.

Sch. Atlas, Pl. 11, fig. 28 (not 29); Sch. Nordsee Diat., Pl. 2, fig. 5.

Found at Station 43g.

Navicula forcipata Grev.

Sch. Nordsee Diat., Pl. 2, figs. 16, 18; Atlas, Pl. 70, fig. 17.

Found at Station 41.

Navicula fusca Grev.

Sch. Atlas, Pl. 7, figs. 1, 7, 8.

Only the varietal form shown above, to which is attached the unimportant "var. *delicata* A. Sch.," was represented and at Stations 41, 43a and 43c, and there frequent.

Navicula Gastrum Ehr. var. *Jenisseyensis* Grun.

Cl. and Grun. Aret. Diat., Pl. 1, fig. 28.

My specimens are duplicates of the above; but that it is an admissible variety of *N. Gastrum* will be seen to be doubtful if we compare with authentic figures of the latter, Ehr. Mikro., Pl. 5, sec. 1, fig. 12, and Van Heurck Syn., Pl. 8, fig. 27. Found at Stations 29g and 43c.

Navicula gelida Grun.

Grun. Diat. F. Jos. Land. Pl. 1, figs. 27-28; Sch. Atlas, Pl. 259, fig. 21.

Found at Stations 20b-c and 23.

Navicula glacialis Cl.

Sch. Atlas, Pl. 6, figs. 37, 39, also fig. 36, no name.

Both the type form (fig. 39) and the variety *septentrionalis* Cl. (fig. 37), originals from Spitsbergen, were found; Stations 41, 43b, 43c and 43g.

Navicula Grani (Jorg.) Grun.

Jorg. Protist. Plankt., Pl. 7, fig. 25; Grun Nord. Plankt., p. 124, fig. 168.

My specimens were larger than any hitherto recorded, being length 0.082 mm., width 0.011 mm., as compared with 0.051 x 0.0057 mm. Found in plankton haul at Station 12b-c.

Navicula humerosa Breb.

Sch. Atlas, Pl. 6, figs. 3-5.

Found in plankton haul at Station 18d.

Navicula imperfecta Cl.

Cl. Vega Diat., Pl. 36, fig. 34; Sch. Atlas, Pl. 259, figs. 9-10.

The rhabdium is not bent sidewise at the centre, as seems to be the case in the above. Found at Station 27s.

Navicula impressa Lager.

Sch. Atlas, Pl. 46, figs. 31-34.

Put by Cleve into *N. cancellata* Donk. where, like a lot of other forms so included, it does not belong. Found at Station 43c.

Navicula inconspicua Greg.

Cl. Nav. Diat., I, Pl. 5, fig. 28.

Found at Station 23, scarce.

Navicula incudiformis Cl., see *N. transitans* var.**Navicula insignificans** Mann, sp. nov.

Pl. I, fig. 8.

Valve narrow-lanceolate but with blunt ends; markings strikingly scanty, consisting of thin, widely spaced costal lines, obscurely cross-barred, on one side of the valve, and rows of beads, two beads long, on the other side of the valve, neither reaching to the raphe; this slightly tortuous, its outer ends strongly hooked; central nodule somewhat to one side of the middle.

Length 0.064 mm., width 0.009 mm., 5-7 unbeaded costae and 6 beaded rows in 0.01 mm.

This sufficiently resembles *N. scalifer* Brun, in Brun Espec. Nouv., p. 38, Pl. 15, fig. 4, to suggest its being a variety; but the similarity is not close. This is a smaller diatom (Brun's having a length of 0.085 to 0.100 mm.) and that species is recorded only from the fossil deposit at Sendai, Japan. However, *N. compressicauda* occurs in both the North Sea and at Sendai, Japan. The above also resembles *N. mendica* Mann in Diat. Philippine Isl., Pl. 23, fig. 3. Found at Station 41.

Navicula interrupta Kütz. (not W. Sm.)

Pl. I, fig. 9. Sch. Nordsee Diat., Pl. 1, fig. 8; Sch. Atlas, Pl. 69, fig. 25, misnamed.

The form here figured and agreeing closely with the references given above may be a wide variety of Kützing's species, at least as it is broadly represented. That no one would call it "interrupted" is evident, and in other points it does not resemble much Kützing's type figure in Kütz. Bacill., Pl. 29, fig. 93. Their identity cannot be decided without seeing Kützing's type specimen, for many of his figures are greatly idealized. I accept the name, however, subject to the foregoing statement. Found at Stations 20b-c and 43c.

Navicula Kepesii Grun.

Grun, Diat. F. Jos. Land, Pl. 1, fig. 37; Cl. Nav. Diat., II, p. 27.

It is hardly possible to hold this separate from *N. directa* W. Sm. Found at Stations 20b-c, 43b and 43c.

Navicula lacrimans A. Sch.

Sch. Atlas, Pl. 12, fig. 61.

I doubt the advantage of Cleve's renaming this *N. gemmulata* var. *Grunovii* Cl. Found only at Station 43b, scarce.

Navicula lata Breb.

Van Heurck Syn., Pl. 6, figs. 1-2.

Probably merely a fresh-water interpolation; Station 23.

Navicula Liber W. Sm.

Sch. Atlas, Pl. 50, figs. 16-18.

Although this fine species is variable, Cleve has nearly obliterated its meaning by uniting with it a host of slightly related forms in Cl. Nav. Diat., I, p. 54. Found at Station 20b-c.

Navicula longa (Greg.) Ralfs.

Sch. Atlas, Pl. 47, fig. 12, no name; and figs. 8, 9.

This variety is needlessly named *N. capensis* by Peragallo in Antarc. Diat. France, p. 56. I at Station 43a.

Navicula Lyra Ehr. var. (?)

Sch. Atlas, Pl. 3, fig. 11.

The only example of this common species is the very doubtful variety above mentioned. Found at Stations 23, 27s, 41 and 43a.

Navicula maculata Bail.

Sch. Atlas, Pl. 6, fig. 38, misnamed, and Pl. 244, fig. 2.

Found at Station 23.

Navicula maxima Greg.

Greg. Diat. Clyde, Pl. 9, fig. 18; Sch. Atlas, Pl. 50, figs. 32-33.

Both the type form and the close variety *umbilicata* Grun. shown above occur, the former at Stations 41 and 43c, and the latter at Stations 41 and 43b.

Navicula oscitans A. Sch., var. (?)

Sch. Atlas, Pl. 6, fig. 40, unnamed.

Cleve considers this a variety of *N. oscitans*, with which it only partly agrees.

Found at Station 41.

Navicula placentula Ehr.

Van Heurek Syn., Pl. 8, fig. 26.

Recorded as living in brackish water. Found in a plankton haul, Station 18d.

Navicula plicata Donk.

Donk. Brit. Diat., Pl. 9, fig. 2; Sch. Atlas, Pl. 50, fig. 40, no name.

Found, one specimen, at Station 23.

Navicula protracta Grun.

Cl. and Grun. Aret. Diat., Pl. 2, fig. 38.

Grunow suggests on page 35 above that this may be a variety of *N. crucicula* (W. Sm.) Donk. This is not to be accepted; see Donk. Brit. Diat., Pl. 6, fig. 14. Found at Station 23s.

Navicula quadratarea A. Sch.

Sch. Nordsee Diat., Pl. 2, fig. 26; Sch. Atlas, Pl. 260, figs. 31-38, etc.

This essentially arctic diatom is unusually variable, many forms being represented in the Canadian Arctic Expedition material. Found at Stations 23, 41, 43a, 43b, 43c, and 43g, also in plankton haul at Station 29g.

Navicula rhombica Greg.

Mic. Journ., 1856, Pl. 5, fig. 1; Van Heurek Belgica, Pl. 1, fig. 9.

What is essentially the same diatom Brun calls *Schizonema Japonicum* in Brun. Espec. Nouv., Pl. 14, fig. 6. Van Heurek's specimen is from the Antarctic and differs considerably from the type. The type form is abundant in the Arctic, is markedly so at Stations 20b-c, 20g, 23, 27s, 41, 43a and 43b.

Navicula rhynchocephala Kütz.

Donk. Brit. Diat., Pl. 6, fig. 4; Van Heurek Syn., Pl. 7, fig. 31; H. L. Sm. Types 314.

This is generally fresh-water, sometimes marine. Found on beach at Bernard harbour, July 15, 1915. The hyaline central area is too large in Van Heurek's figure.

Navicula rostellata Greg. (not Kütz.)

Greg. Diat. Clyde, Pl. 9, fig. 20; Sch. Nordsee Diat., Pl. 2, fig. 31, poor.

Found at Station 20b-c. Near *N. apiculata* Breb., and so placed by De Toni, Syl. Alg., p. 50, and by Grunow in Sch. Atlas, Pl. 46, note.

Navicula Schultzii Kain.

Sch. Atlas, Pl. 244, fig. 5.

The type was found fossil in an artesian well boring at Atlantic City, New Jersey. I found specimens at the Philippine Islands. The form here discovered Heiden has designated as var. *mexicana* in the above reference. Found at Station 20b-c.

Navicula scintillans A. Sch.

Sch. Atlas, Pl. 70, fig. 61.

The general appearance of this diatom suggests the genus *Mastogloia*. Found at Station 23. It is rather close to varieties of *N. glacialis* Cl.

Navicula sibirica Grun.

Pl. I, fig. 10. Cl. Nav. Diat., II, p. 29; Cl. Vega Diat., Pl. 37, fig. 38.

In the figure here given, a variety of this species, the apparent border is due to the vertical curve of the sides. Found at Station 23.

Navicula Smithii Breb.

Sch. Atlas, Pl. 7, figs. 16, 19; Grun. Diat. F. Jos. Land, Pl. 1, fig. 40.

Several forms of this prolific and variable diatom were found; the type form at Stations 23 and 41c, varieties at 20b-c, 43b and 43c, and what Grunow calls var. *borealis* in the second reference above at Station 23.

Navicula splendida Greg.

Sch. Atlas, Pl. 13, fig. 31; Pl. 69, fig. 22.

This species is quite abundant; Stations 23, 43a, 43g, and very large and brilliantly marked specimens at Station 43c.

Navicula subcincta A. Sch., *teste* Grunow; see **N. controversa** Mann, nom. nov.**Navicula suborbicularis** Greg.

Sch. Atlas, Pl. 8, figs. 1-6.

Found at Station 43b.

Navicula subsalina Donk.

Donk. Brit. Diat., Pl. 4, fig. 2; Van Heurck Syn., Pl. 11, fig. 6.

Found at Station 41. Hardly to be kept separate from *N. amphibaena* Bory.

Navicula superba Cl.

Cl. Vega Diat., Pl. 36, figs. 23-24.

Found at Stations 23, 41 and 41c, and the var. *elliptica* (fig. 24 above) in a plankton haul at Station 40d; my specimen of the last had length 0.058 mm. See Cl. Nav. Diat., II, p. 29.

Navicula transitans Cl., var. *incudiformis* Cl.

Cl. Vega Diat., p. 467, Pl. 36, fig. 26.

Found at Stations 20b-c, 23 and 43b.

Navicula trigonocephala Cl. (name pre-empted).

Cl. Vega Diat., Pl. 36, fig. 27; Sch. Atlas, Pl. 259, figs. 17-18.

The name is pre-empted by (Ehr.) Ralfs in Prit. Infus., p. 999. Found at Station 29g, plankton haul.

Navicula valida Cl. and Grun.

Cl. and Grun. Arct. Diat., Pl. 2, fig. 29.

Found at Station 43a.

Navicula vetula A. Sch. var (?)

Pl. I, fig. 11. Compare Sch. Atlas, Pl. 69, fig. 33, and Pl. 12, 6₂, 49.

Although this diatom agrees with the above in general outline, in the longitudinal division of the markings and in the raphe area, it appears to be a coarser form. It also is about the same size as the smaller of the two figures of Schmidt. Cleve in Nav. Diat., I, p. 85, gives for the larger figure above the following: length 0.05 mm., width 0.024 mm., 10 lines in 0.01 mm.; my specimen gives length 0.032 mm., width 0.016 mm.; 6 lines in 0.01 mm. A new name may be needed for this form. Found at Station 23.

Nitzschia Hass.**Nitzschia acuta** Hantz.

Sch. Atlas, Pl. 334, figs. 25-26.

Found only at Station 27, there frequent.

Nitzschia distans Greg.

Greg. Diat. Clyde, Pl. 14, fig. 103; Van Heurck Syn., Pl. 62, figs. 10, 18.

Found only at Station 23.

Nitzschia hungarica Grun.

Van Heurck Syn., Pl. 58, figs. 19-22.

Although usually fresh-water it inhabits brackish localities and is listed in Cleve's Arct. Diat. Found at Station 27_s, frequent there.

Nitzschia hybrida Grun.

Van Heurck Syn., Pl. 60, fig. 4; Cl. and Grun. Arct. Diat., Pl. 5, fig. 95.

Found at Station 43_c, two gatherings.

Nitzschia incurva Grun.

Van Heurck Syn., Pl. 70, figs. 13-14.

As Van Heurck intimates, this may be a variety of *N. Lorenziana* Grun. See fig. 12 same plate. Found at Station 20_{b-c}.

Nitzschia insignis Greg.

Van Heurck Syn., Pl. 61, fig. 1; Perag. Diat. France, Pl. 75, figs. 3-12.

Found rather frequently in material from Stations 23, 41, 43_a and 43_c.

Nitzschia linearis (Ag.) W. Sm.

Sm. Brit. Diat., Pl. 13, fig. 110.

Found at Stations 23 and 27_s.

Nitzschia littorea Grun.

Van Heurck Syn., Pl. 59, figs. 21, 25.

It is questionable if anything is gained by uniting this with *N. thermalis* (Kütz.) Grun., as is suggested above; compare fig. 20 of the same plate.

Nitzschia longissima (Breb.) Ralfs.

Van Heurck Syn., Pl. 70, figs. 1-4.

Nearly all specimens were very small and delicate, like fig. 3 above. Cleve and Grunow record this from the Arctic. Found at Stations 20_{b-c} and 43_c.

Nitzschia marginulata Grun.

Van Heurck Syn., Pl. 58, figs. 12-15.

Found at Stations 20_{b-c}, 43_b and 43_c.

Nitzschia plana W. Sm.

W. Sm. Brit. Diat., Pl. 15, fig. 114; Van Heurck Syn., Pl. 58, fig. 10.

Scarce and not quite typical; found at Station 23.

Nitzschia polaris Grun.

Grun. Diat. F. Jos. Land, Pl. 1, figs. 62-63.

Found in a dredging from Station 29g and a plankton haul from same locality.

Nitzschia seriata Cl.

Gran Nord. Plankt., p. 130, fig. 171.

Rather infrequent in two plankton hauls, Stations 12b-c and 12x.

Nitzschia Sigma (Kütz.) W. Sm.

Van Heurck Syn., Pl. 66, figs. 1-9.

The type form occurs but is uncommon; many varieties were found, as var. *Habirshawii* (fig. 4 above) and var. *Sigmatella* (fig. 6 above). Found at Stations 20b-c, 41, 43b, 43c.

Nitzschia socialis Greg. var. **Kariana** Grun.

Cl. and Grun. Arct. Diat., Pl. 6, fig. 108.

Found at Station 23.

Nitzschia Weissflogii Grun.

Perag. Diat. France, Pl. 76, figs. 3-4.

Only one specimen found, Station 41.

Plagiogramma Grev.**Plagiogramma Gregorianum** Grev.

Perag. Diat. France, Pl. 82, fig. 7; Micro. Journ., 1859, Pl. 10, figs. 1-2.

Some authors change this to *P. staurophrum* (Grev.) Heib., perhaps correctly; see Greg. Diat. Clyde, p. 497, Pl. 10, fig. 37 and De T. Syl. Alg., p. 718.

Found at Stations 20b-c and 27s, scarce.

Pleurosigma W. Sm.**Pleurosigma angulatum** W. Sm.

W. Sm. Brit. Diat., Pl. 21, fig. 205; Perag. Pleuro., Pl. 5, figs. 3-5.

This common species is here uncommon; only a rare specimen in one dredging, Station 29g.

Pleurosigma balticum (Ehr.) W. Sm.

W. Sm. Brit. Diat., Pl. 22, fig. 207; Perag. Pleuro., Pl. 7, fig. 20.

Rather abundant, especially at Stations 20b-c, 23 and 27s, large and typical specimens.

Pleurosigma Fasciola (Ehr.) W. Sm. var. **sulcata** Grun.

Cl. and Grun. Arct. Diat., Pl. 4, fig. 75.

This seems to be a strictly polar variation of the type. Found at Station 23.

Pleurosigma formosum W. Sm.

W. Sm. Brit. Diat., Pl. 20, fig. 195; Perag. Pleuro., Pl. 1, figs. 1, 6.

All the specimens below normal size; only in one dredging, Station 20b-c.

Pleurosigma glaciale Cl.

Cl. Vega Diat., Pl. 35, fig. 13, see p. 476.

Found in plankton haul at Station 29g. Length of my specimen 0.13 mm.

Pleurosigma Grundlerii Grun.

Perag. Pleuro., Pl. 6, fig. 1.

It is rather close to *P. rigidum* W. Sm. See other figures on same plate. Found only at Station 23.

Pleurosigma lineare Grun.

Perag. Pleuro., Pl. 9, fig. 11; Pl. 7, fig. 16, misnamed; Cl. N. and R. Diat., Pl. 1, fig. 8, misnamed.

Not to be confused with *P. tenuissimum* W. Sm. Rhaphe line in first reference above incorrect.

Found at Station 43b.

Pleurosigma longum Cl.

Cl. and Grun. Aret. Diat., p. 49, Pl. 3, fig. 71; Perag. Pleuro., Pl. 2, fig. 2.

One specimen measured was about 15 times as long as wide, namely length 0.45 mm., width 0.031 mm., and suggesting var. *kerquense* Grun. in Perag. Pleuro., Pl. 2, fig. 1, but without the lunate curves at the ends of rhaphe. Found at Stations 23 and 43c.

Pleurosigma Normanii Ralfs.

Perag. Pleuro., Pl. 4, fig. 6, misnamed.

This is not to be confused with *P. affine* Grun., as is done by Peragallo. Found at Station 20b-c.

Pleurosigma Parkerii Harrison.

Perag. Pleuro., Pl. 8, fig. 33.

One specimen at Station 27s.

Pleurosigma speciosum W. Sm. var. *gracilis* Perag.

Perag. Pleuro., Pl. 2, fig. 19.

Found at Station 23.

Pleurosigma strigosum W. Sm.

W. Sm. Brit. Diat., Pl. 21, fig. 203; Perag. Pleuro., Pl. 5, fig. 1.

My specimens are nearer Peragallo's figure than the type shown by Smith. In form it closely resembles the untypical *P. Sturbergii* in Grun. Diat. F. Jos. Land, Pl. 1, fig. 57, but the markings are coarser. Found at Stations 23 and 43b.

Pleurosigma tenuissimum W. Sm.

W. Sm. Brit. Diat., Pl. 22, fig. 213; Cl. and Grun. Aret. Diat., p. 58, Pl. 4, fig. 77.

Both the type form, first reference above, and the var. *hyperborea* Grun., second reference above, were found in the same dredging, Station 20b-c.

Pleurosigma Wansbeckii Donk.

Micro Journ., 1858, Pl. 3, fig. 7; Perag. Pleuro., Pl. 7, figs. 23, 24.

This should not be confused with *P. balticum* W. Sm. Found at Stations 20b-c and 43c, plentiful in the former.

Pseudo-Amphiprora Stauroptera (Bail.) Cl., see **Tropidoneis Stauroptera** (Bail.) V. H.**Pseudo-Eunotia** Grun.**Pseudo-Eunotia Larva** Mann, sp. nov.

Pl. I fig. 12.

Valve arcuate, broad, its dorsal side evenly and strongly convex, its ventral side barely concave; ends blunt, rounded; markings of closely set rows of strong beads, generally transverse, slightly curved toward the apices; the beading close to the apices less developed, thereby giving a false semi-hyaline appearance, somewhat overemphasized in the illustration.

Length 0.037 mm., width 0.007 mm., 11.2 lines in 0.01 mm.

Scarce, found only at Station 43a.

Rhabdonema Kütz.**Rhabdonema adriaticum** Kütz.

Sch. Atlas, Pl. 217, fig. 17-26; Van Heurck Syn., Pl. 54, figs. 11-13.
Very prolific at Stations 23 and 43a.

Rhabdonema arcuatum Kütz.

Sch. Atlas, Pl. 220, fig. 17-26.

Found at Stations 23, 43a, 43b, 43c and 41.

Rhabdonema minutum Kütz.

Van Heurck Syn., Pl. 54, fig. 17-21.

Found at Stations 41, 43a, 43b and 43c, generally abundant; typical at 43a.

Rhabdonema Torellii Cl.

Sch. Atlas, Pl. 218, figs. 18-20; Cl. Aret. Diat., Pl. 1, fig. 20.

The above two illustrations are given to show that *R. Japonicum* Brun can hardly be separated from this, but is probably merely a fossil variety. Found at Station 23.

Rhizosolenia Ehr.**Rhizosolenia styliformis** Bright.

Perag. Rhizo., Pl. 4, figs. 1-5.

Found in two plankton hauls, Stations 6b and 12d, there very abundant.

Rhoicosigma Grun.**Rhoicosigma mediterraneanum** Cl.

Perag. Pleuro., Pl. 9, figs. 28-31; Cl. N. and R. Diat., Pl. 1, fig. 9.

My specimens are small and otherwise not quite typical. Found at stations 20b-c.

Rhoicosphenia Grun.**Rhoicosphenia curvata** (Kütz.) Grun.

Van Heurck Syn., Pl. 26, figs. 1-4.

Found abundantly at Stations 20b-c, 41, 41c and 43b.

Rhopalodia Müller**Rhopalodia gibba** (Kütz.) O. Müll.

Sch. Atlas, Pl. 253, figs. 1-17; Van Heurck Syn., Pl. 32, figs. 1-5.

Found only at Station 43c.

Sceptroneis Ehr.**Sceptroneis gemmata** Grun.

Van Heurck Syn., Pl. 37, fig. 3.

Van Heurck, in Treat., p. 332, makes this *Grunoviella gemmata* (Grun.) V.

H. Found at Station 43a.

Scoliopleura Grun.**Scoliopleura latestriata** (Breb.) Grun.

Sch. Atlas, Pl. 261, figs. 4-5. misnamed; Van Heurck Syn., Pl. 17, fig. 12.

Found at Station 23, scarce.

Scoliopleura tumida (Breb.) Rab.

Sch. Atlas, Pl. 262, figs. 1-6; Van Heurck Syn., Pl. 17, figs. 11, 13.

Found at Station 43a, also scarce.

Stauroneis Ehr.**Stauroneis anceps Ehr.**

Van Heurek Syn., Pl. I, figs. 4-5.

Although the members of this genus belong in reality to *Navicula* the generic name *Stauroneis* is retained by most authors for convenience, but not as indicating a scientific generic division. Beach at Bernard harbour, July 15, 1915.

Stauroneis apicula Dickie.

Perag. Diat. France, Pl. 7, fig. 30.

Found at Station 272, scarce.

Surirella Turp.**Surirella foliifera Mann, sp. nov.**

Pl. I, fig. 13.

Valve broad, ovate, robust; rim massive, winged; costae beginning at the margin in leaf-shaped plates, which are strongly striped longitudinally, and from the inner ends of which the costae extend as narrow lines or ridges to the inconspicuous median area; polar space at the blunt end of the valve evident.

Length 0.056 mm., width 0.033 mm. Only two specimens found, at Station 206-c.

Surirella insignis Ostr.

Ostr. Diat. N.E. Greenland, p. 216, Pl. 13, fig. 19; Sch. Atlas, Pl. 21, fig. 15, no name.

This species seems to be rare. Several fine specimens were found, Station 23, in two gatherings.

Surirella striatula Turp.

Sch. Atlas, Pl. 24, figs. 18, 20-21; Van Heurek Syn., Pl. 72, figs. 5-6.

Scarce, Station 43g; usually a very prolific species.

Synedra Ehr.**Synedra affinis Kütz. var. gracilis (Kütz.) Grun.**

Van Heurek Syn., Pl. 41, fig. 15b.

Found at Stations 206-c and 43b, abundant in both.

Synedra arctica Grun. (not O'Me.).

Grun. Oster. Diat., p. 401, Pl. 8, fig. 3.

Average length of my specimens 0.099 mm., average width 0.004 mm. Found in plankton haul at Station 43f.

Synedra kamtschatica Grun. (?)

Cl. and Grun. Arct. Diat., Pl. 6, figs. 111-113.

My specimens have the wide hyaline space at the middle and agree in general with the above, except that the marginal lines are much shorter. They are similar to "*Thalassionema gelida* Perag." in Perag. Antaret. Exp. France, Pl. 3, fig. 10, which is a *Synedra*. Very common at Station 20g.

Synedra pulchella Kütz.

Van Heurek Syn., Pl. 41, figs. 1-5.

The species is normally fresh-water, sometimes brackish. Found abundant at Station 23.

Thalassiosira Cl.**Thalassiosira grvida Cl.**

Grun. Nord. Plankt., p. 18, fig. 12.

Found in plankton hauls at Stations 6b, 12d, 18d and 25b-c, common in all, especially the last.

Trigonum Cl.

For a discussion of the need for this genus see Mann, *Diat. Alb. Voyages*, p. 289.

Trigonum arcticum (Bright.) Cl.

Sch. Atlas, Pl. 79, figs. 5-7.

This massive diatom is common in all arctic waters. An identical form, except in general of larger size, is equally common in the Antarctic; its name is unnecessarily changed to *T. antarcticum*. Found at Stations 41, 43a, 43b, 43c and 43g.

Trigonum formosum (Bright.) Cl.

Sch. Atlas, Pl. 79, figs. 2-3.

To be held separate from the former. Found at Station 43c—scarce.

Tropidoneis Cl.

Tropidoneis elegans (W. Sm.) Cl.

Greg. *Diat. Clyde*, Pl. 12, fig. 58; Perag. *Diat. France*, Pl. 41, figs. 2-6.
Found only at Station 43a, and scarce.

Tropidoneis Lepidoptera (Greg.) Cl.

Van Heurck *Syn.*, Pl. 22, figs. 2-3; Perag. *Diat. France*, Pl. 39, figs. 1-9.
Found at Stations 20b-c and 43c, scarce in both.

Tropidoneis Stauroptera (Bail.) V. II

Van Heurck *Treat.*, p. 263; Cl. *Arct. Diat.*, Pl. 3, fig. 13 misnamed; Greg. *Diat. Clyde*, Pl. 12, fig. 59c, misnamed.

Cleve failed to see the fitness of his genus *Tropidoneis* for this diatom and proposed the unnecessary new genus *Pseudo-Amphipora*. Found at Stations 23, 41, 43b and 43c; scarce in all.

Smithsonian Institution, United States National Museum, Washington, D.C., May, 1925.

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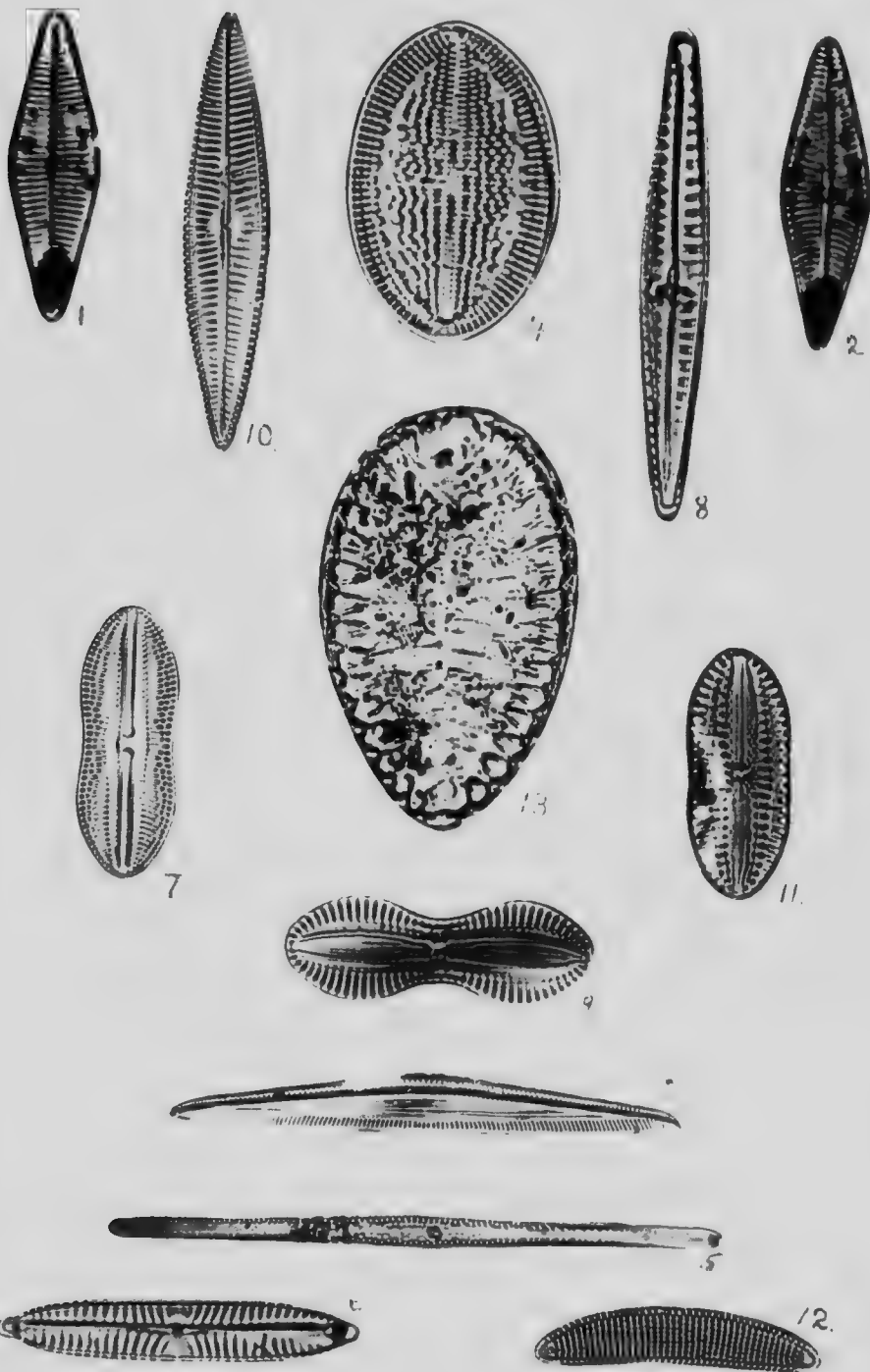
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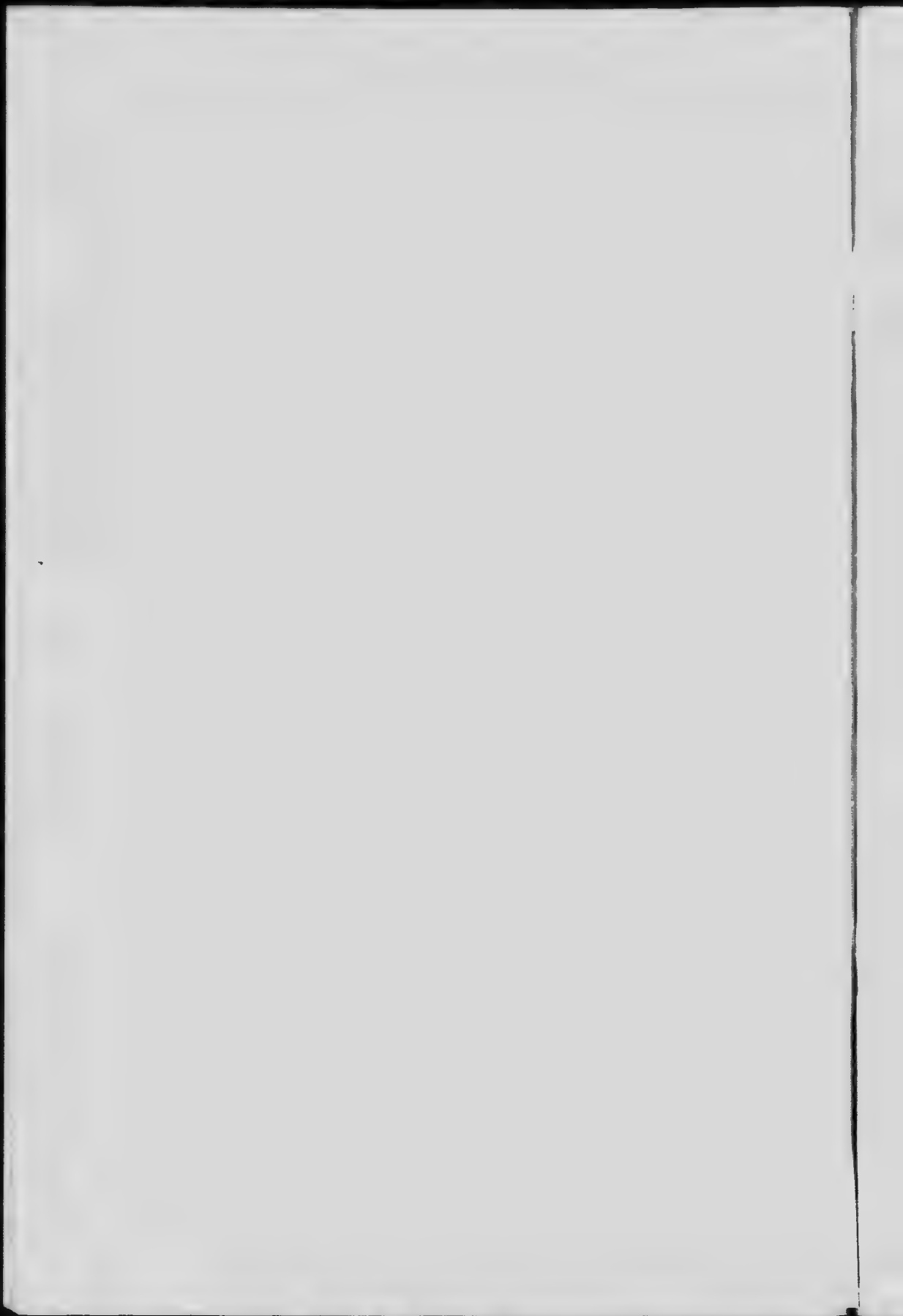
EXPLANATION OF FIGURES

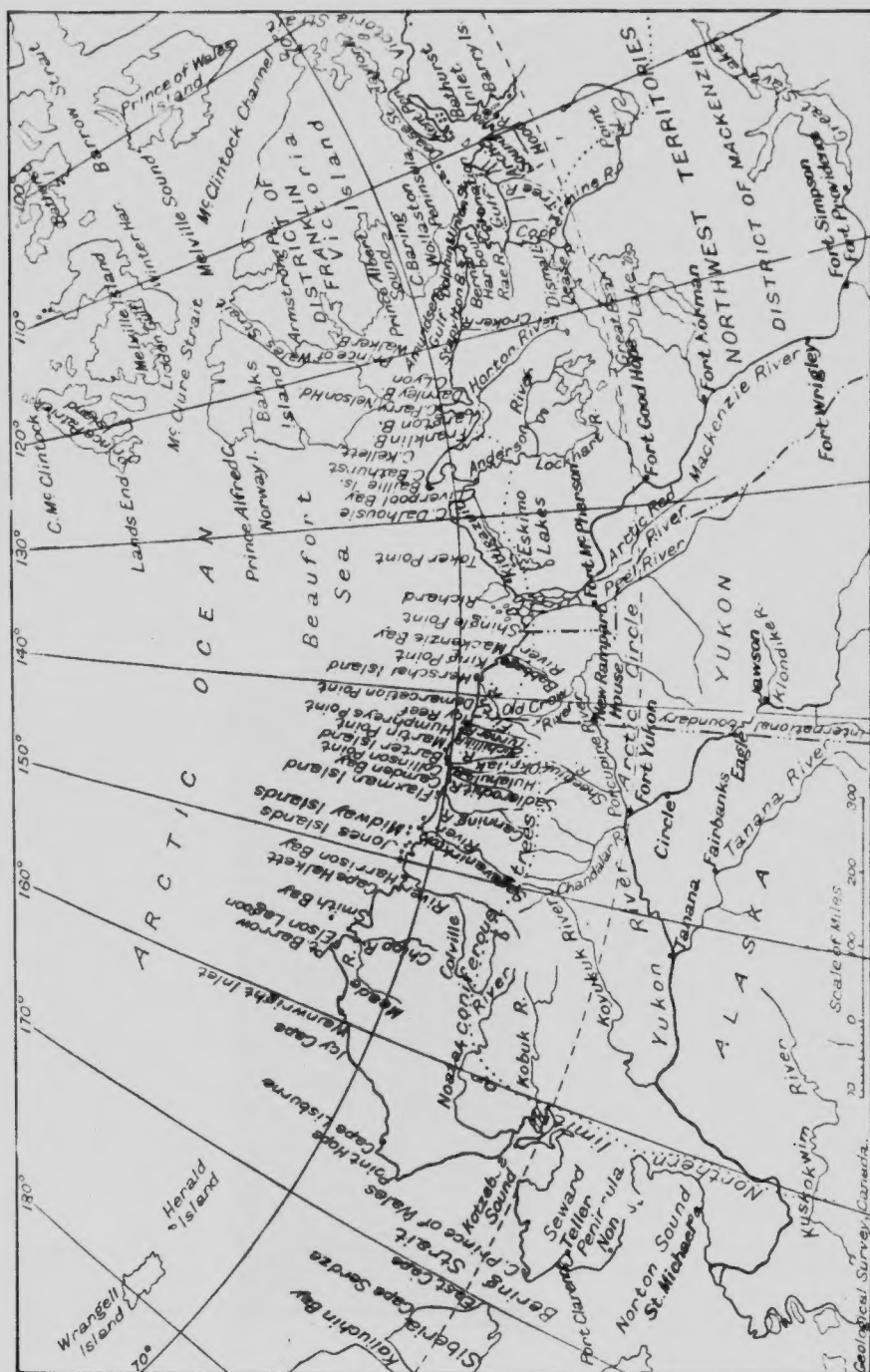
Fig. 1.	<i>Achnanthes rhombica</i> Ostr. (upper valve).....	X	1090
2.	<i>Achnanthes rhombica</i> Ostr. (lower valve).....	X	1090
3.	<i>Amphora excludens</i> Mann, sp. nov.....	X	510
4.	<i>Cocconeis kamchatkiensis</i> Mann, sp. nov.....	X	1010
5.	<i>Glyphodesmis interspiralis</i> Brun. (?).....	X	520
6.	<i>Navicula bipustulata</i> Mann, sp. nov.....	X	1110
7.	<i>Navicula controversa</i> Mann, nom. nov.....	X	500
8.	<i>Navicula insignificans</i> Mann, sp. nov.....	X	1110
9.	<i>Navicula interrupta</i> Kütz. (not W. Sm.).....	X	1000
10.	<i>Navicula sibirica</i> Grun.....	X	710
11.	<i>Navicula retula</i> A. Sch. var. (?).....	X	1120
12.	<i>Pseudo-Eunotia Larva</i> Mann, sp. nov.....	X	1110
13.	<i>Surirella folialifera</i> Mann, sp. nov.....	X	1090

MARINE DIATOMS

PLATE 1







Western Arctic Coast of America; Canadian Arctic Expedition, 1913-1918.

AD47324



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3-18

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